

With respect to the Ethiopian region—the field-work of Sir Andrew Smith, Livingstone, and Du Chaillu—46 are mentioned, and 40 on the Indian region, which has been so much investigated by those who, from other reasons, have had to take up their residence in our Eastern empire. There are 25 works referred to respecting the Nearctic region, and as many as 138 on the Neotropical, which demonstrates how rich a field South America has proved to the students of biology, it being remembered that Mr. Darwin himself obtained the bulk of his practical experience of animal life in that continent. Forty-one works on the Australian and nine on the Pacific region include the remainder of the list. Mr. Sharpe's edition of Layard's "Birds of South Africa," Mr. Hume's "Stray Feathers," Lord Walden's Memoirs on the Birds of Celebes and the Philippines, Mr. Scammon's "Marine Mammals of the North-Western Coast of North America," Messrs. Baird, Brewer, and Ridgway's "History of North American Birds," Dr. E. Coues' "Birds of the North-West," Prof. T. R. Jones' "Manual of the Natural History, Geology, and Physics of Greenland," Messrs. Sclater and Salvin's "Nomenclator Avium Neotropicalium," Mr. A. W. Scott's "Elementary Treatise on the Mammals of New South Wales," the late Mr. J. Brenchley's "Cruise of the *Curaçoa*," Dr. Buller's "Birds of New Zealand," being the most important works which have appeared during the last two or three years, on the regions other than the Palearctic, above referred to.

That several works have appeared since Mr. Sclater's address was delivered—including, among the most important, the late Mr. Blyth's "Catalogue of the Mammals and Birds of Burmah," edited by Dr. J. Anderson, Dr. Dobson, Lord Walden, and Mr. Grote, a special notice of which we hope very shortly to give—and that Mr. Wallace's important two volumes on the "Geographical Distribution of Animals" may be expected very soon, shows how much stress is now being laid on the fauna of different regions, and adds further to the importance and value of the encyclopædic address, the contents of which we have brought before the notice of our readers on the present occasion.

OUR BOOK SHELF

An Elementary Treatise on Curve Tracing. By Percival Frost, M.A. (London: Macmillan and Co., 1872.)

On the Transcendental Curve whose Equation is—

$$\sin y \sin my = a \sin x \sin nx + b.$$

By H. A. Newton and A. W. Phillips. (From the *Transactions of the Connecticut Academy*, vol. iii., 1875.)

MR. FROST'S work is an elementary one, inasmuch as no advanced acquaintance with the differential and integral calculus is required; nor do his methods turn upon the higher algebra, nor upon the science of projections. Indeed he is careful to restrict himself for the most part to fairly elementary processes. It is not a complete treatise, as he does not touch upon roulettes or upon curves, given by intrinsic equations. These latter curves have been, as is well known, discussed and fully illustrated in the late Dr. Whewell's two memoirs in the *Cambridge Philosophical Transactions* (vols. viii. and ix.) We miss, too, all account of curves of historical interest. Occasional notices of these have been given by different writers, but we should like a sketch of them drawn up by some competent hand, with an account of their origin and applications.

Reasons have weighed with Mr. Frost in making these omissions, and we do not grumble at his taking his own line in his treatment of the subject as he has given us a full treatise, abundantly illustrated by figures, of curves, ranging from simplicity to considerable complexity of form. The preface is an interesting one (though by the way, the author was rather unwilling to write it), and in it attention is called to the fact, among other reasons, why junior students should devote some little time to curve-tracing, that the subject of graphical calculation is coming more into use, being applied to problems in statics (see Culmann's "Graphische Statik"), engineering, and crystallography.

We cannot here give any detailed sketch of the contents of the work, further than to draw attention to the last chapter, which treats of the inverse problem, viz., given the form of a curve to investigate its equation, or an approximation to it. We do not remember to have seen the attempt made elsewhere. Should the subject be taken up and carried on with success, we may look for the equation to one's name taking the place of the name on an address card.

The majority of the curves discussed and traced in Mr. Frost's book are algebraical ones.

Messrs. Newton and Phillips write that from the form of a transcendental curve it is not easy to state the equation that will represent it. So instead of taking up the inverse problem, they have selected from out of the host of transcendental equations, and exhibit twenty-four pages of plates of the plane curves furnished by assigning different values to the constant quantities a , b , m , and n in the equation given above.

These forms, as might be imagined, are all symmetrical, and much resemble carpet patterns. The tract is an interesting evidence of the patience and skill at draughtsmanship of the authors.

Kurzes Chemisches Handwörterbuch zum Gebrauche für Chemiker, Techniker, Aerzte, Pharmaceuten, Landwirth, Lehrer, und für Freunde der Naturwissenschaft überhaupt. Bearbeitet von Dr. Otto Dammer. (Berlin: Robert Oppenheim, 1876.)

To keep pace with the rapid growth of chemical science would be almost a hopeless task, were it not for the literary organisation and classification undertaken from time to time by such writers as the author of Watts's "Dictionary of Chemistry," and Dr. Dammer, the compiler of the present volume. To writers of this class who take upon themselves the laborious drudgery of "stock-taking," workers in the ranks of science owe a debt of gratitude which cannot be too highly estimated.

In coupling together the names of Mr. Watts and Dr. Dammer, it is by no means our intention to imply any similarity between the respective "dictionaries." Dr. Dammer's work is perhaps more truly a dictionary in the proper signification of the term than Mr. Watts's seven volumes, for while the latter contain full, and in many cases, exhaustive information on the various subjects treated of, the whole of the former is comprised in one volume royal octavo, of some eight hundred pages. The justly esteemed "dictionary" of English chemists need fear, therefore, no rival in the present volume, the two works rather bearing to each other the relationship of a chemical encyclopædia to a glossary of chemical terms.

The longest articles in the present volume are those on absorption, equivalents, alum, ammonia, aniline, aromatic bodies, ashes, animal respiration, atmosphere, atom, base, benzoic acid, benzene, succinic acid, beer, blood, soils, bread, chemistry, chromic acid, steam, diffusion, albumin, electricity, petroleum, nutrition of plants and of animals, acetic acid, acetates, colouring matters, fats, flesh, galvanic batteries, gases, tan, glass, coal, hydrocarbons, madder, crystal, copper, illuminating gas, solution, magnetism, metals, metalloids, microscope,

milk, mortar, nickel, photography, analysis (qualitative and quantitative), nitric acid, nitrates, salts, oxygen, gunpowder, sulphur, sulphuric acid, silver, specific gravity, thermometer, porcelain, hyposulphites, water, wine, tartrates, tungstates, sugar, &c. The following subjects are treated of in some detail:—Alcoholometry, aniline dyes, areometer, iron, carbonates, light, mineral waters, common salt, sulphates, heat.

The value of the dictionary as a work of reference is decidedly enhanced by the adoption of thick type for the words heading the articles. In the case of recently discovered compounds we are of opinion that a short bibliographical reference to the paper wherein such compounds are first made known would have greatly increased the value of the articles without materially adding to their length. The author has fallen into an error in treating of thermo- and pyro-electricity under the same heading; the former term is employed by electricians in this country to denote the electricity developed by heat in *conductors*, the latter to denote the electricity produced by heat in *non-conductors*.

Bearing in mind the enormous range of subjects now embraced by the science of chemistry, for a volume of the present size the amount of information conveyed is really very great. With the exception above pointed out, the articles, though necessarily brief, are to be depended on for accuracy, and we can safely recommend Dr. Dammer's dictionary as a useful work of reference.

R. M.

Clouds in the East. Travels and Adventures on the Perso-Turkoman Frontier. By Valentine Baker. With Maps and Illustrations. (London: Chatto and Windus, 1876.)

THE author of this interesting volume had special facilities for visiting the Russian outposts in Asia and the Persian frontier; he had powerful recommendations to the highest Russian and Persian authorities. By various causes, however, he was prevented from taking complete advantage of these, so that the main part of his work describes his journeys in the district to the south of the Caspian, and from Teheran towards the north-east Persian frontier. He reached the Caspian by Trebizond and Tiflis, and gives some interesting particulars as to navigation on the inland sea. He was able to visit the mouth of the much-talked-of Attrek, and found that the Gurgan, to the south of the Attrek, is the real Russian frontier in this region. He was unfortunately prevented from visiting Merv and Herat, which he had intended to do. Mr. Baker's main objects were sport and to ascertain the real nature of the advances made by Russia in Central Asia. Of the former he got a fair amount around Teheran, and his work will be of very considerable importance to those who are interested in the movements of Russia. He took considerable pains to ascertain Persian feeling on the question; Persia cannot understand, or rather misunderstands, England's inaction. Mr. Baker gives many valuable notes as to the nature of the country passed over, its productions, antiquities, and inhabitants. Concerning the Turkomans especially, and their wonderful houses, many details will be found. Altogether the work is an intelligent and interesting narrative of travel in an important region, and a substantial contribution to the Asian question. There are three good maps, but the chromolithographs are very poor specimens of their kind.

LETTERS TO THE EDITOR

The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.]

The Use of the Words "Weight" and "Mass"

I WILL supplement Mr. Bottomley's authorities for the meaning of *gravity* by others which will be perhaps considered

more relevant. Maupertuis, "Figure de la Terre," Paris, 1738, writes:—"Il faut bien distinguer ici la pesanteur d'un corps d'avec son poids . . . La pesanteur dans un grand corps, n'est pas plus grande que dans un petit. Il n'en est pas ainsi du poids; il dépend non-seulement de la pesanteur, mais encore de la masse des corps . . . il est le produit de la pesanteur par la masse" (p. 155). Subsequently, he lays down the distinction between *pesanteur* and *gravité* which Clairaut adopted; but universally the English *gravity* has been used as synonymous with the French *pesanteur*. Airy, "Gravitation," p. 3: "To take the ordinary force of gravity for an instance, we might measure it by the pressure which is produced on the hand . . . or by the number of inches through which the lump of lead would fall in a second of time . . . But there is this difference between the two measures; if we adopted the first . . . we should find a different measure by the use of every different piece of lead; whereas if we adopt the second . . . we shall get the same measure for gravity whatever body we suppose subject to its influence." Here the broad distinction between "weight" and "gravity" is clearly laid down; the one is the "impressed force" on the falling body, the other its "accelerative effect" (Thomson and Tait, "Treatise on Nat. Phil.," 217-219), or the more familiar "moving force" and "accelerating force." In the "Treatise" the former is called the "force of gravity on the mass of a body," 220; but "gravity" alone seems clearly enough defined as acceleration, by the words "According to this formula, therefore, polar gravity will be

$$g = 32.088 \times 1.005133 = 32.2527."$$

Again, § 226: "The augmentation of gravity per degree . . . is, at most . . . The average . . . differs certainly, but little from 32.2."

I think it evident that *gravity* has not been "lying ready for use, but left almost idle," as Mr. Bottomley supposes.

To the restriction on the use of weight—which I feebly support, but which is certainly not mine—I do not conceive that the "Act of Parliament" offers any bar; as the weights of masses are merely thereby defined in terms of the weight of the standard mass. This restricted sense is clearly recognised in such passages as the following, from Thomson and Tait's "Elements," § 366, "The measurement of force whether in terms of the weight of a stated mass in a stated locality . . ."

As to the compounds "*centivires*," &c., I advisedly adopted the Latin prefixes in their old etymological sense, so as to have wholly Latin names and thereby prevent any confusion with the C. G. S. kinetic measures. The employment in the metric system being quite conventional and contrary to analogy, I feel justified in following older precedents.

J. J. WALKER

"The Recent Origin of Man"

IN NATURE, vol. xiii. p. 245, a writer over the initials "W. B. D." reviews in no very complimentary terms my book entitled "The Recent Origin of Man." I am charged with inconsistency, inaccuracy, incompetency, &c. When charges of this sort are made they ought not to be made lightly, and the writer making them ought to weigh his statements.

My space is necessarily brief, but I beg permission to comment on a few of the assertions made by "W. B. D." in rendering his judgment on the premises.

1. He remarks: "The statement that no traces of a rude and imperfect civilisation have been met with in the East is refuted by the discovery of enormous quantities of flint implements in Egypt and of neolithic axes in Asia Minor and in India. In the river gravels of both these regions paleolithic *haches* have been found of the same type as those of Amiens and Abbeville."

We all know that paleolithic implements have been found in the river-gravels of India; I refer to this on p. 31 of my book; but I am not aware that paleolithic implements have been found in the river-gravels of Egypt or Asia Minor. As "W. B. D." asserts it, I beg leave to ask for the particulars.

As for the occurrence of flint implements in Egypt, I remark on p. 478: "Flint implements have been found in Egypt but they belong to the Neolithic age, and occur on the surface, or near the surface, or in the tombs." I mention that one implement of paleolithic type had been found. I show that flint arrow heads and flint knives have been frequently found in the Egyptian tombs by the side of the mummies.

That Sir John Lubbock found in the Nile valley a few implements resembling the paleolithic types I am aware; but implements of paleolithic type were found at Cissbury by Col. A.